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ARBORETUM BULLETIN
OF THE
ASSOCIATES

APRIL, 1939

THE
MORRIS ARBORETUM
OF THE
UNIVERSITY OF PENNSYLVANIA

Vol. 2 No. 15

MORRIS ARBORETUM
CHESTNUT HILL
PHILADELPHIA, PA., U.S.A.

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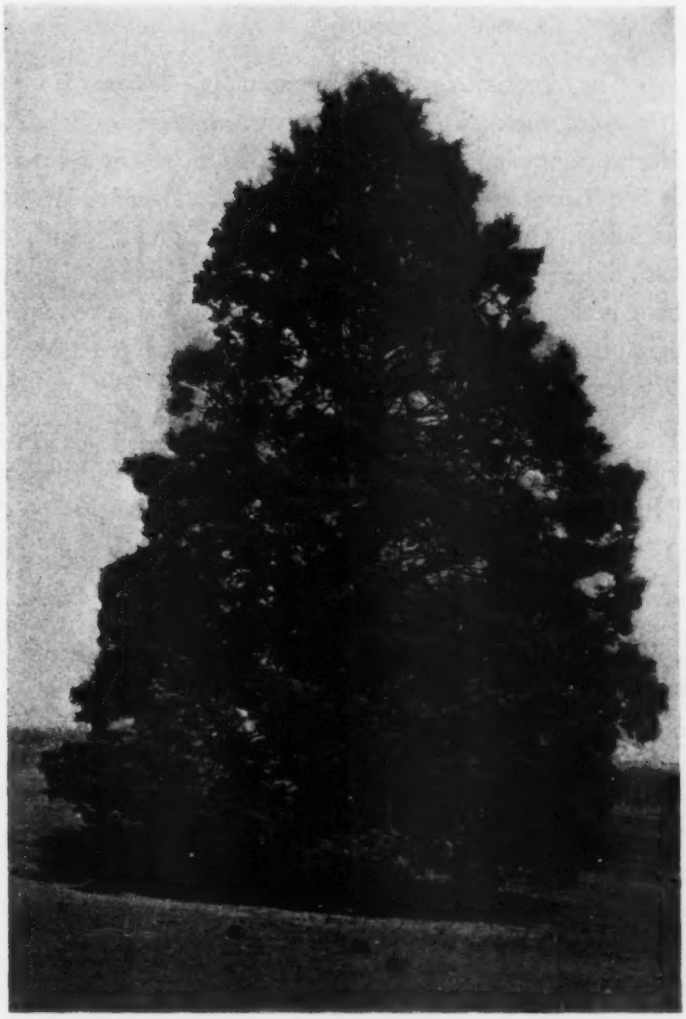

Sawara Cypress
Chamaecyparis pisifera Eldl.
Var. *squarrosa* Beiss. & Hochst.

ARBORETUM BULLETIN—APRIL, 1939

The frontispiece is a specimen of Sawara Cypress *(Chamaecyparis pisifera* Endl. var. *squarrosa* Beiss. & Hochst.) growing in the Arboretum south of the Mansion. It is a Japanese evergreen introduced into America in 1843 (Rehder). The tree forms a rather narrow upright top, dense, with horizontal or twisted lower branches. The reddish-brown bark peels off in narrow strips. The rather dense top has a light, feathery appearance and bears glaucous green leaves. The leaves are spreading, flat, linear, rather soft, and are about ¼ to ⅓ of an inch long. The dark-brown cones are rounded, about ¼ to ⅓ of an inch in diameter, and bear broadly-winged seeds.

This species has many variations in color and form that are very decorative. It is hardy as far north as New England.

The cover drawing represents the "MILLER'S HOUSE" near the mill on the Wissahickon, "Bloomfield Farm" section of the Arboretum.

The drawing and photograph were made by Gustave Liebscher.

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GRASSES*

—BY—

DR. E. M. GRESS

THE STATE OF PENNSYLVANIA is rich in its grass flora, approximately 250 species being now known to science. This abundance of types is in part due to the great variety of climatic, geological and topographical conditions to be seen in the State. With the glaciated areas in the northeastern and northwestern corners of the State, with sandy lake shores of Presque Isle and on Lake Erie, with coastal plain conditions in the extreme east, the basis is formed for a varied ecology. With extensive river valleys following different trends of the compass, with continued wet conditions in the Poconos and in the northern part of the State providing bogs and marshes, with the great mountain ridges offering their varied exposures to light and moisture, and, last of all, the great fertile farming areas, it would be expected that not only the grasses, but other plants as well, would be represented in rich variety in Pennsylvania.

The botanist is happy over such rarities with long Latin names as *Triplasis purpurea,* found only in the sand along the coast, on Presque Isle and around Lake Erie, with *Panicum verrucosum,* another coastal plain species, with *Sporobolus heterolepsis* on the Serpentine Barrens near Nottingham in Chester County, and with *Melica purpurascens,* north of Ole Bull Park in Potter County. The number of rarities with equally long Latin names for the scientist could be much extended.

USES

However, for most of us the grasses are chiefly significant because no other family of plants furnishes mankind throughout the world so much food as does the lowly grass family.

In this country, the mind turns instantly to the Wheats as one of our most important food grasses. Originating in the Old World, this group has become one of our mainstays. It is said, moreover, to have given its name to the newly discovered continent before the grain itself had come to the New World. *Emmer,* one of the ancient wild wheats, is said to have been modified into *Amerigo,* first name of the man for whom the new continent, America, was named. Thus, America might be called the "land of wheat."

Another important food grass, native in the New World, is Maize, Indian corn, already cultivated and named by the Indians when Columbus discovered the "land of wheat." Maize is one of our most important forage crops for livestock,

*Abstract of lecture given at the Morris Arboretum on December 10, 1938.

both for the grain and for the dried fodder made from the tops. This great grass is perhaps the most important food contribution that America has given to the world. Millions find it a part of their daily bread.

Members of the *Sorghum* tribe of the grass family serve a variety of uses. Sugar cane competes with the sugar beet to sweeten our coffee and to furnish an important item of nutrition. Broom corn contributes to cleanliness and good order in the house. Sudan and Johnson grasses furnish hay forage.

One hardly needs to be told that an eastern grass, Rice, feeds perhaps half of the people of China, and those of other eastern Asiatic countries.

Other grasses important throughout the civilized world are the ancient grains—barley, oats, rye and millet.

Important as sources of hay for the domestic animals are timothy, blue grass, and a host of other species.

The Bamboos are a most valuable part of the grass family in Japan and other lands, where furniture and even houses are built of bamboo, to say nothing of a host of less important uses. The young, tender shoots are eaten as a vegetable like asparagus.

For many parts of the country, some of the worst weeds in farm and garden are Quack Grass and Foxtail, while Crab Grass invades lawns and golf grounds.

Among the most important manufactured products are those obtained from the grains and grasses. Starch, alcohol, glucose, paper and wall board begin an endless list.

GROSS ANATOMY

The discussion of the structure of grasses was illustrated with slides.

The root system is generally fibrous and lives in the top soil. Some of the larger species, like Indian corn, form proproots that brace the plant against winds. These cord-like proproots are found at the joints of the stem near the ground, and grow obliquely into the soil.

The stems or culms are made up of solid joints or nodes, where the leaves are attached, and the spaces between the joints, internodes, are usually cylindrical, or less often, flattened. The interior may be filled with pith, as in maize, or be empty as in the bamboos, wheat and oats.

The leaves have a sheathlike base that wraps around the stem and gives off the leaf blade that is the conspicuous, spreading part of the foliage. Other structures were pointed out that are important to botanists in classifying the grasses.

Most important are the *flower parts*. These are seldom large and showy, as in many of the higher plants, and require close study because of their small size. The parts representing the calyx and corolla are minute and easily overlooked. The grasses have the stamens and pistils required for sexual reproduction, for seed formation, but again, these are not striking in appearance and are often overlooked. The dangling stamens, usually three in number, are most readily seen in the early morning, as are the feathery stigmas.

In some grasses the flower is perfect in bearing the stamens and pistils in the same flower. Sometimes the stamens and pistils are borne in different flowers on the same stem. Such an arrangement is seen in the Indian corn, the tassels bearing the many stamens in clusters at the top of the stem, while the cob with the long protruding styles and stigmas—the so-called "silk"—represent the fruit-bearing structure. Such a plant is *monoecious*.

In the Buffalo Grass of the western prairies, the staminate (male) flowers are borne on different plants from those bearing the pistillate (female) flowers. Such an arrangement is *dioecious*.

The inflorescence consists of groups of flowers borne in characteristic arrangements as spikes, racemes and panicles.

PASTURE AND LAWN GRASSES

While about 250 species of grass are known to science in Pennsylvania, only a few sorts are cultivated or even domesticated. The wild sorts made up a large part of the low vegetation seen on uncultivated lands, in marshes or in forests.

For *pastures*, the grass must be strongly rooted in the soil in order that grazing animals may not pull it out of the ground. It must have buds, stems or other structures located near the ground, or in it, from which new growth may be developed to replace what was torn off by the animal. It must be nutritious and not too tough.

Perhaps grasses appeal to urban residents most strongly as *lawn* plants. The lawn is the background and filler for the picture made by the bright colors and attractive designs imbedded in it.

For lawn purposes most of the qualities needed in pasture grasses are important. The lawn mower replaces the grazing animal. The grass must renew itself and be enough of a monopolist in its habit and growth to exclude competing weeds and less desirable species of grass.

Here, obviously, there is room for care in selecting the kinds of grass to be used. There is but a small number of species in actual use. Kentucky blue grass, red top, the bent grasses and the fescues form the mainstay of lawn makers.

GRASSES FOR LAWNS*

—BY—

DR. JOHN MONTEITH, JR.

United States Department of Agriculture

THE POPULAR INTEREST in beautifying homes and public grounds with lawns and gardens has been steadily increasing coincident with the increasing amounts of leisure time available to the American public and the increasing interest in out-of-doors recreation. Many persons are now combining their out-of-door activities with construction work on the grounds about their homes. If space does not allow for both grass and flowers, it is usually the lawn which receives first consideration.

As compared with the improvements which have been made in flowers and shrubs, there has been little advance in the selection of strains and varieties of lawn plants which may be particularly well adapted for special uses or for various conditions of temperature, moisture and shade. Lawns have been planted with a lawn grass mixture and have been expected to take care of themselves if given the routine cutting, rolling, watering, and possibly some weeding.

Very little choice of plants is open to the home owner who is interested in developing an attractive lawn. With some 1500 species of grasses native to this country, one might think there would be a wide choice for turf purposes. Our native species, however, will not tolerate the close cutting and other cultural conditions demanded by our turf practices. Only one of them, buffalo grass *(Buckloë dactyloides)* is commonly used for turf purposes, and it is used only on the western prairies. Most of the grasses we use for turf are species that have been introduced from Europe.

In selecting grasses for turf purposes there is not a large list of species from which to choose.

For general lawn purposes in the North, one can wisely limit himself to a mixture of Kentucky bluegrass *(Poa pratensis)*, Chewings red fescue *(Festuca rubra* var. *commutata)*, redtop *(Agostis alba)* and Colonial bent *(Agrostis tenuis)*. Under most circumstances Kentucky bluegrass can make up from 68 to 80 per cent of the mixture. For well-drained shaded areas, particularly well up North, the mixture should contain at least 50 per cent of red fescue. For shaded areas which are poorly drained, rough bluegrass *(Poa trivialis)* should replace the fescue. Ryegrass may be used to give a quick cover, but it should be regarded as a temporary grass which is ordinarily not desirable where a good stand of the permanent grasses can be obtained.

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* Abstract of lecture given at the Morris Arboretum on January 14, 1939.

In the South, the choice of permanent grasses is even more limited—to Bermuda grass *(Cynodon dactylon)*, Carpet grass *(Axonopus compressus)* and Centipede grass *(Eremochloa ophiuroides)*. These grasses grow during the summer months, and become more or less dormant during the winter. Under such conditions, rye-grass is planted in the late fall to give the lawn a green covering during the winter months.

Among lawn grasses at the present time there is no such thing as a commercial supply of seed of a variety or a species developed to meet any particular set of requirements. This is not because of any lack of variability within the grass species. It is merely because no improvement work has been carried on with lawn grasses on a commercial scale.

There are available a limited number of successful strains or varieties of creeping bent, such as Washington and Metropolitan, which have been selected for the special requirements of putting greens. These do not develop true to type from seed, however, and must be grown by the vegetative method from stolons. Moreover, they are not suitable for lawn purposes, unless they can be given the constant attention which they demand. There is no reason, however, why the discriminating home owner cannot have a fine bent lawn if he is willing to spend somewhat more time and money, which are necessary to keep the bent grasses growing in healthy condition.

Although Kentucky bluegrass, for example, makes up such an important part of the grass seed mixtures for our Northern lawns, improved strains have not been developed commercially. Bluegrass is used both for pasture and turf plantings, and yet there is no choice of varieties on the market. The farmer when he buys seed for his pastures or hay fields may receive it out of the same bag from which seed is sold for a lawn grass mixture.

There are variations in quality in different commercial bluegrass seed, but these are not varietal differences. Seed varies in size and weight, in percentage germination and in weed seed content. It is these variations which are responsible for the different grades of lawn grass seed on the market. The better seed produces better turf, so it is well worth the usually small additional cost to obtain seed with the highest percentage of germination and the minimum content of weed seed.

It was because of this lack of varieties available commercially for special purposes and sets of conditions that the selection and development of particularly desirable strains of bent and bluegrass were begun some years ago by the United States Golf Association Green Section.

It is evident in any turf that there are certain individual plants which seem to withstand close cutting particularly well, to be particularly resistant to disease, or to exhibit some other particularly desirable characteristic.

In Kentucky bluegrass we are particularly interested in selecting for ability to spread and make a dense turf, for durability and ability to withstand close cutting, for resistance to leafspot and other diseases, and for ability through vigorous growth to compete successfully with clover and other weeds. If these characteristics can be combined with fineness of texture and ability to hold good color, we will have the ideal strain of bluegrass for turf purposes. Such a grass, however, would not give a sufficient heavy yield of forage to be highly rated as a pasture or hay grass.

For several years individual plants have been selected and propagated vegetatively. Also the plants have in some instances been self-pollinated. The result is that at the present time there have been developed on our plots at the Arlington Turf Garden decidedly superior strains of Kentucky bluegrass.

These methods are similar to those which have been used successfully for many years by the Green Section in developing new and superior strains of creeping and velvet bents. Notable among these selections are the Washington and Metropolitan strains of creeping bent, which are used so widely on golf greens in this country.

In recent years, this selection work has been continued with the result that many new strains have been developed and tried out, not only on the turf garden plots, but also on greens in various sections of the country. Many of these are fine in texture, hold up well in color, and are resistant to "brownpatch," to "dollarspot" and in some cases even to insect injury. The better strains are now being tried out on greens for durability under the trampling and heavy play which a grass must successfully withstand if it is to be used on the golf greens. They have been planted on various greens throughout the country and this year will be planted in still more sections, in order to determine the range of climatic conditions which they will tolerate. Some of these strains have promise also as lawn grasses, which will be easier to maintain than the varieties of creeping bent now on the market.

MORE TREE DISEASES

RECENT NUMBERS of the *Plant Disease Reporter,* issued by the Division of Mycology and Disease Survey, Bureau of Plant Industry in the U. S. Department of Agriculture, contain discouraging news for tree lovers.

The issue of February 15, 1938, reports the occurrence of Witch's Broom of Black Locust, *Robinia pseudacacia,* in mild form in Pennsylvania and Ohio; in severe form in Maryland, District of Columbia, Virginia, Tennessee and North Carolina. This has not been found in New England or in New York.

The American White Elm is reported to be suffering from a virus disease that has been discovered in places in Ohio, northern Kentucky, southern Indiana and Illinois. Seen first as a city disease, this trouble has been found in forests in West Virginia. The onset of the disease is marked by a slight wilting and brittleness of the leaf. The roots and the inner bark rot and death follows soon.

The fungus causing the Dutch Elm Disease of this tree has been isolated in a living condition from the bodies of two kinds of elm bark beetles in areas where trees affected by the disease had previously been found and removed.

A serious disease of the London Plane Tree, so much planted in Philadelphia and vicinity, is reported to be spreading to the southward. In Philadelphia and nearby New Jersey, more than 7000 trees are reported to have died. Baltimore has lost more than 700 trees, and the disease is known to be in Washington, D. C.

PLANT DISTRIBUTION

—BY—

MORRIS ARBORETUM, UNIVERSITY OF PENNSYLVANIA

THE PLANTS listed below are ready for distribution to Associates of the Arboretum. All are trees or shrubs, many having distinct ornamental value. The supply in cases is limited. If it can be arranged, Associates are urged to visit the Arboretum and make selections. It is hoped that members may take their plants with them. Plants going beyond the Japanese beetle quarantine must have all soil removed from the roots.

Amorpha fragrans, Sweet — M1470

A native deciduous shrub having compound leaves and purple-blue flowers.

Amorpha fruticosa, Linn. — M5395

A native species similar to the above.

Benzoin aestivale, Nes. — M6674

The native Spice Bush. An upright, slender, deciduous shrub, bearing yellow flowers in spring and scarlet fruits in the autumn.

Berberis Wilsonae subcaulialata, Schneid. — M6815

Deciduous or half-hardy shrub of Chinese origin.

The following varieties of Boxwood represent plants propagated by cuttings from the original Arboretum specimens. These plants have withstood severe low temperatures without artificial protection, and should therefore be hardy.

Buxus sempervirens angustifolia, West. — M364

The leaves generally are lance-oblong shaped.

Buxus sempervirens Handsworthii, K. Koch — M357

An upright form having larger, dark-green leaves.

Buxus sempervirens marginata, Loud.

A yellow-edged foliage variety.

Buxus sempervirens rotundifolia — M350

A sturdy, dark-green type of doubtful origin.

Buxus sempervirens suffruticosa, Linn. — M376

A compact form known as "Edging Box."

Celtis occidentalis, Linn. — M4624

A native deciduous tree known as the Hackberry; bears orange-red to dark-purple fruits.

Chamaecyparis Lawsoniana, Parl. — M7834

The Lawson Cypress, a native evergreen tree of great beauty.

Chamaecyparis pisifera squarrosa, Beiss. & Hochst. — M1127

A glaucous, blue-green color form of the Sawara Cypress.

Cotoneaster acutifolia, Turcz. — M5432

A slender, spreading, deciduous shrub bearing pale pink flowers and small black fruits. A Chinese species.

Cotoneaster acutifolia villosula, Rehd. & Wils. — M5431

A Central and Western Chinese variety of the above species.

Evodea Henryi, Forst. — M4333

A small, deciduous, spreading tree having compound leaves. A native of Central China.

Hypericum densiflorum, Pursh. — M235

A small, slender, upright, deciduous shrub bearing a profusion of small yellow flowers. A native species.

Hypericum patulum, Thunb. — M4408

A low, spreading Japanese shrub bearing an abundance of small yellow flowers.

Ilex verticillata, Gray — M5466

Seedling plants of our native deciduous holly. A small shrub valued for its decorative bright-red fruits.

Koelreuteria paniculata, Laxm. — M4378

The Japanese Varnish Tree, producing in summer panicles of yellow flowers, and later, conspicuous, bladder-shaped seed pods.

Ligustrum acuminatum macrocarpum, Schneid. — M4369

A Japanese upright, deciduous shrub, bearing large, black shiny fruits.

Ligustrum medium (ovalifolium), Fr. & Sav. — M228

A dwarf type of doubtful origin.

Ligustrum ovalifolium variegatum, T. Moore

A variegated form of the California privet.

The following list of "Bush Honeysuckles" are deciduous, upright, flowering shrubs of ornamental value:

Lonicera notha carnea rosea — M4910

Lonicera tatarica latifolia, Loud. — M4833

Lonicera tatarica Leroyana, Rehd. — M4919

Malus pumila Niedzwetzkyana, Schneid. — M1735

An interesting reddish-flesh-colored crab apple of southwestern Siberian and Turkestan origin.

Neillia sinensis, Oliv. — M469

A graceful, slender, branching, low, deciduous shrub bearing pink flowers. A Central Chinese species.

Pinus excelsa, Wall.

The Himalayan Pine. A handsome pine of pyramidal habit, with wide, spreading branches and drooping foliage.

Populus Maximowiczii, Henry. — M4301

A handsome hybrid poplar of vigorous growth and wide, spreading branches.

Populus nigra betulifolia, Torr. — M4309

A variety of the black poplar—of good form.

Populus trichocarpa, Torr. & Gray. — M5956

The Western balsam poplar.

Rhamnus crenata, Sieb. & Zucc. — M1489

An oriental deciduous shrub bearing red, changing to black fruits.

Rhamnus infectoria, L., "Avignon Berry" — M5513

A spreading deciduous shrub native to southern Europe.

Rhododendron arborescens, Torr. — M5517

A native deciduous shrub bearing white or pinkish fragrant flowers.

Rhododendron japonicum suringar x R. molle — G. Don — M5520

A salmon-pink flowering, deciduous "Azalea" hybrid.

Rhododendron obtusum amoenum, Rehd. — M7321

An evergreen spreading low shrub bearing small leaves and magenta flowers.

Rhododendron obtusum Hinodegiri — Hort.

Somewhat similar to the above, but having large leaves and red flowers.

Rhodotypus scandens, Mak. — M4549

A deciduous, spreading shrub having large white flowers followed by black fruits. A native of China and Japan.

Salix cordata, Muhlenb. — M6589

One of our native shrub willows.

Salix Matsudana tortuosa — M3159

A small tree of slender upright and twisting branches with green bark.

Salix purpurea amplexicaulis, Boiss. — M528

A native of Europe, Asia and Africa.

Securinega ramiflora, Muell. — M4703

A deciduous shrub having slender arching branches of graceful form; of Asiatic origin.

Spiraea Lenneana — M5907

A free flowering garden form producing dense panicles of rose-colored flowers.

Spiraea salicifolia x S. superba — M5916

An interesting hybrid between a European and Asiatic species having rose-colored flowers.

Spiraea sanssouciana, K. Koch. — M5918

Another garden hybrid of upright habit and floral beauty.

Staphylea pinnata, L. — M4552

An upright, deciduous shrub having greenish-white flowers and inflated fruits.

Symphoricarpus orbiculatus elongatus, Hort. — M5920

A varietal form of the Indian current—a good ground cover.

Syringa japonica, Decne. — M4960

The Japanese lilac. A small tree valuable for its late blooming season.

Thuja occidentalis globosa, Gord. — M4778

A compact globose form of our native American Arbor-Vitae.

Viburnum dilatatum, Thunb. — M5546a

A Japanese upright bushy deciduous shrub having numerous flowers followed by scarlet fruits.

FINAL WINTER LECTURE

April 15, 1939

MRS. A. C. BARNES — *Cultivation of Hardy Ferns*

Mrs. Barnes is Director of the Arboretum of the Barnes Foundation at Merion, Pennsylvania, and has given special attention at the Barnes Arboretum to the cultivation of a very large number of hardy ferns, one of the attractive and novel features of this very beautiful and interesting institution.

The Arboretum of the Barnes Foundation was started in 1922, when the property was acquired from the late Captain Joseph Lapsley Wilson, who made it a condition of the sale contract that the plantings of trees begun by him in 1887 should be preserved. At present, the Arboretum contains about 1,250 species and varieties of woody plants, including some rare and unusual trees, 250 Lilacs, 245 Roses, Cotoneasters, Barberries, broad-leaved evergreens, etc., which, together with the 88 species and varieties of hardy ferns in the woods, form a collection containing well-developed specimens of decorative as well as horticultural interest.

The lecture will begin at 2:30 P. M. Guests coming in cars will find convenient parking space near the entrance on Meadowbrook Lane.